

## PATENT ABSTRACTS OF JAPAN

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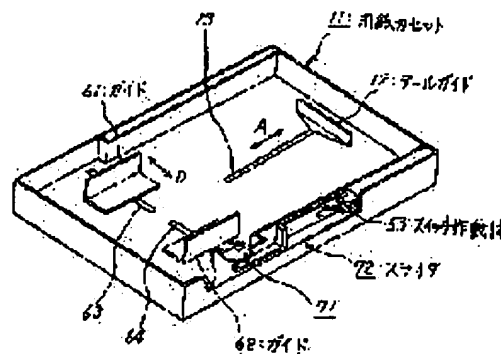
## (54) PAPER SHEET CASSETTE DEVICE

## (57)Abstract:

PURPOSE: To provide a paper sheet cassette device capable of detecting the size of sheets accurately.

CONSTITUTION: A paper sheet cassette device is provided with a sheet cassette 11, a tail guide 12 arranged slidably in the feeding direction of sheets, guides 61 and 62 arranged slidably in vertical direction relative to the feeding direction of the sheets, a drum which is rotated interlockingly with the movement of the tail guide 12 and on which drive projections are formed, and a slider 72 which is reciprocated interlockingly with the movement of the guides 61 and 62 and on which recessed and protruded parts are formed.

Also it is provided with multiple switches and a switch operating body 53 which are arranged oscillatably, engaged with the drive projections and recessed and protruded parts, and turns on and off the switches according to the engaged conditions. Thus a specified switch is turned on and off according to the rotational position of the drive projections, and also a specified switch is turned on and off according to the position of the recessed and protruded parts.



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3081117

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**CLAIMS**

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[Claim(s)]

[Claim 1] (a) The form cassette which holds a form, and the tail guide arranged in the conveyance direction of the (b) form free [ migration ], (c) The guide arranged in the perpendicular direction free [ migration ] to the conveyance direction of a form, (d) The drum on which you made it migration of said tail guide interlocked with, it was rotated, and the drive projection was formed, (e) The slider with which you made it migration of said guide interlocked with, it was made to reciprocate, and irregularity was formed, (-- f --) -- turning on and off -- a form -- size -- detecting -- plurality -- a switch -- (-- g --) -- rocking -- free -- arranging -- having -- said - - a drive -- a projection -- and -- irregularity -- being engaged -- engagement -- a condition -- corresponding -- making -- a switch -- turning on and off -- making -- switching action -- the body -- having -- things -- the description -- \*\* -- carrying out -- a form -- a cassette unit .

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the form cassette unit of a printer.

[0002]

[Description of the Prior Art] Conventionally, the form cassette is arranged by the printer and one sheet of form is picked out at a time from said form cassette with a hopping roller. The top view of the form cassette unit of the former [ drawing 2 ] and drawing 3 are drawings showing the switching action device section in the conventional form cassette unit.

[0003] In drawing, it is the tail guide with which 12 was arranged [ as opposed to / in 11 / this form cassette 11 ] in the direction of arrow-head A free [ migration ] as opposed to the form cassette. Therefore, a slot 13 can be formed in said form cassette 11, a pin 14 can be formed in said tail guide 12, and this pin 14 can be slid now along said slot 13 (\*\*\*\*\* how). Moreover, a link 16 is arranged in order to detect the location of said tail guide 12. The end of this link 16 is connected with said form cassette 11 through a pin 17, and is supported free [ rocking ] in the direction of arrow-head B by using said pin 17 as the supporting point. On the other hand, the other end of said link 16 is connected with the tail guide 12 through said pin 14, and is supported free [ rocking ] by using a pin 14 as the supporting point. Moreover, it applies to an other end side from the center section of the link 16, the long slot 18 is formed, and it is made for this long slot 18 and said pin 14 to be engaged. Therefore, if said tail guide 12 is moved in the direction of arrow-head A, a link 16 will be rocked, moving said pin 14 along the long slot 18.

[0004] And rocking movement of said link 16 can be transmitted to the drum 24 arranged free [ rotation ], and can make now each switch which a switch unit 25 does not illustrate turn on and off by rotating this drum 24. therefore, the sector link gear 21 is attached in the edge by the side of the pin 17 of said link 16, on the other hand, the drum gear 23 is attached in said drum 24, and said link gear 21 and drum gear 23 are made to carry out engagement (carrying out and obtaining)

[0005] Moreover, the location in a circumferencial direction and the location in shaft orientations are mutually changed in the perimeter of said drum 24, and two or more drive projections 31 are arranged in it. On the other hand, make it correspond to said drive projection 31, and two or more follower projections 33 are arranged in said switch unit 25, it is made to correspond to each follower projection 33, and a switch is arranged in it. Therefore, the follower projection 33 retreats [ in / in the drive projection 31 / the follower projection 33 ] with rotation of said drum 24, and it is made for each switch of a switch unit 25 to be turned on and off.

[0006] In the form cassette unit of said configuration, while setting first the form which is not illustrated to the form cassette 11, said tail guide 12 is moved according to a form. At this time, with migration of the tail guide 12, a pin 17 is rotated by the link 16 as the supporting point, and it rotates a drum 24. When this drum 24 is rotated corresponding to the size of a form, said drive projection 31 pushes the follower projection 33 of each switch alternatively, and makes a switch turn on and off. Thus, the size of a form is detectable with a switch unit 25.

[0007] And said switch unit 25 generates the code signal assigned for every size of a form, and is sent to a printer. Therefore, a printer can distinguish the size of a form with said code signal.

[0008]

[Problem(s) to be Solved by the Invention] However, in said conventional form cassette unit, since it is made to correspond to migration of the tail guide 12 and a switch is turned on and off, only the die length of a form will

detect the size of a form. By the case where followed, for example, the form of the size of A4 seal is carried out every width, and the case where the form of the size of A5 seal is carried out longitudinally, since the die length of a form is equal, the location of the tail guide 12 will become the same.

[0009] Therefore, the size of a form is correctly undetectable. This invention solves the trouble of said conventional form cassette unit, and aims at offering the form cassette unit which can detect the size of a form correctly.

[0010]

[Means for Solving the Problem] Therefore, it sets to the form cassette unit of this invention. The form cassette which holds a form, and the tail guide arranged in the conveyance direction of a form free [ migration ], You interlock migration of said guide with the guide arranged in the perpendicular direction free [ migration ] to the conveyance direction of a form, and the drum on which you made it migration of said tail guide interlocked with, it was rotated, and the drive projection was formed, and it is made to reciprocate, and has the slider with which irregularity was formed.

[0011] Moreover, it has the switching action object which is arranged free [ two or more switches which detect the size of a form, and rocking ], engages with said drive projection and irregularity, is made to correspond to an engagement condition, and is made to turn a switch on and off by turning on and off.

[0012]

[Function] According to this invention, it sets to a form cassette unit as mentioned above. The form cassette which holds a form, and the tail guide arranged in the conveyance direction of a form free [ migration ], You interlock migration of said guide with the guide arranged in the perpendicular direction free [ migration ] to the conveyance direction of a form, and the drum on which you made it migration of said tail guide interlocked with, it was rotated, and the drive projection was formed, and it is made to reciprocate, and has the slider with which irregularity was formed.

[0013] If a form is set to a form cassette, moving said tail guide and guide, migration of a tail guide is interlocked with, a drum will rotate, migration of a guide will be interlocked with, and a slider will reciprocate. Moreover, it has the switching action object which is arranged free [ two or more switches which detect the size of a form, and rocking ], engages with said drive projection and irregularity, is made to correspond to an engagement condition, and is made to turn a switch on and off by turning on and off.

[0014] In this case, the rotation location of a drive projection changes corresponding to rotation of said drum, and a concavo-convex location changes corresponding to reciprocation of said slider. And it is made for a predetermined switch to be turned on and off corresponding to the rotation location of said drive projection, and a predetermined switch is made to turn on and off by the concavo-convex location.

[0015]

[Example] Hereafter, it explains to a detail, referring to a drawing about the example of this invention. The perspective view of a form cassette unit [ in / in drawing 1 / the 1st example of this invention ], the top view of a form cassette unit [ in / in drawing 4 / the 1st example of this invention ], The perspective view of the switching action device section [ in / in drawing 5 / the 1st example of this invention ], The perspective view of a slider [ in / in drawing 6 / the 1st example of this invention ], the perspective view of a detection lever [ in / in drawing 7 / the 1st example of this invention ], The perspective view of a link [ in / in the perspective view of a drum / in / in drawing 8 / the 1st example of this invention / and drawing 9 / the 1st example of this invention ] and drawing 10 are the state diagrams of the switch in the 1st example of this invention.

[0016] In drawing, 11 is the tail guide arranged in the direction of arrow-head A free [ migration ] in the back section of a form cassette and the form cassette 11 in the conveyance direction of the form which 12 does not illustrate. Therefore, a slot 13 can be formed in said form cassette 11, a pin 14 can be formed in said tail guide 12, and this pin 14 can be slid now along said slot 13.

[0017] Moreover, a link 16 is arranged in order to detect the location of said tail guide 12. The end of this link 16 is connected with said form cassette 11 through a pin 17, and is supported free [ rocking ] in the direction of arrow-head B by using said pin 17 as the supporting point. On the other hand, the other end of a link 16 is connected with the tail guide 12 through said pin 14, and is supported free [ rocking ] by using a pin 14 as the supporting point. Moreover, it applies to an other end side from the center section of the link 16, the long slot 18 is formed, and it is made for this long slot 18 and said pin 14 to be engaged. Therefore, if said tail guide 12 is moved in the direction of arrow-head A, a link 16 will be rocked in the direction of arrow-head B, moving said

pin 14 along the long slot 18.

[0018] Rocking movement of said link 16 can be transmitted to the drum 24 arranged free [ rotation ], and can make now each switch which a switch unit 25 does not illustrate turn on and off by rotating this drum 24. Therefore, the sector link gear 21 is attached in the edge by the side of the pin 17 of said link 16, on the other hand, the drum gear 23 is attached in said drum 24, and the link gear 21 and said drum gear 23 are meshed. Moreover, the location in a circumferencial direction and the location in shaft orientations are mutually changed in the perimeter of said drum 24, and two or more drive projections 51 are arranged in it. In addition, this drive projection 51 is arranged in four steps in shaft orientations.

[0019] By the way, it not only can detect now the die length of the form set to the form cassette 11, but in this example, it can detect the width of face of a form now. Therefore, the guides 61 and 62 of a pair are arranged in the front section of the form cassette 11 in the conveyance direction of a form free [ migration in the direction of arrow-head D ]. And the projection which slots 63 and 64 do not illustrate to said guides 61 and 62 again can be formed in said form cassette 11, and it can be slid now on this projection along said slots 63 and 64. In addition, you may make it arrange only a guide 62, without using a guide 61.

[0020] It interlocks mutually and moves, and from each guides 61 and 62, racks 67 and 68 make it project, respectively, and are formed, said guides 61 and 62 are meshed with both the racks 67 and 68, and a pinion 69 is arranged. Therefore, if one side of guides 61 and 62 is moved manually, a pinion 69 is rotated, and another side can be interlocked and can be moved.

[0021] Moreover, a sector lever 71 and a sector slider 72 are arranged so that the location of said guides 61 and 62 can be detected. While being supported free [ rocking ] in the direction of arrow-head E centering on a pin 73 and forming a gear 75 in a periphery, a rod 74 makes an end project, and said lever 71 is formed, and is made to contact said guide 62. On the other hand, said slider 72 is arranged free [ migration ] along the conveyance direction of a form, and the signal generator 77 by which the rack 76 made the back section correspond to the width of face of a form, and was assigned to it is formed in the front section in the conveyance direction. This signal generator 77 is constituted by the irregularity of an aperture 78 and notching 79 grade. Therefore, said slider 72 is made to reciprocate in connection with said lever 71 being made to rock by the direction of arrow-head E by the direction of arrow-head F.

[0022] Thus, while a drum 24 is rotated corresponding to the die length of the form set to the form cassette 11, a slider 72 is made to reciprocate corresponding to the width of face of a form. Then, in order to generate the code signal which was made to correspond to the die length of a form, and the combination of width of face, and was assigned, arrange the follower projections 33a-33d of four in a switch unit 25, and it is made to correspond to the rotation location of said drum 24, and the location of a slider 72, and enables it to have carried out the depression of the follower projection 33 alternatively.

[0023] Therefore, it engages with the drive projection 51 of said drum 24, and the signal generator 77 of a slider 72, and in order to make it correspond to an engagement condition and to make each switch turn on and off, the switching action object 53 is arranged free [ rocking ]. This switching action object 53 consists of four detection levers 56 of a configuration as shown in drawing 7, and each detection lever 56 is supported respectively free [ rocking in the direction of arrow-head C ] by the pin 55 so that it can be made to rock mutually.

[0024] And said detection lever 56 has the 1st contact section 58 made to engage with the drive projection 51 of said drum 24, the 2nd contact section 59 made to engage with the signal generator 77 of said slider 72, and the 3rd contact section 60 made to contact each follower projections 33a-33d of said switch unit 25. therefore, it corresponds to the size of a form, i.e., the die length of a form, and the combination of width of face -- making -- each follower projection 33 -- the depression of the a-33d can be carried out alternatively.

[0025] If a switch is arranged by the said follower projections [ 33a-33d ] back end, respectively, the switch which corresponds if the follower projections 33a-33d are pushed by the detection lever 56 and retreated is turned on and the depression by the detection lever 56 is lost, the switch which moves forward and corresponds will become off in the follower projections 33a-33d. Therefore, said follower projections 33a-33d will be advanced by the energization force of said spring to the follower projections 33a-33d, if it is energized with the spring which is not illustrated at said detection lever 56 side and the depression by the detection lever 56 is lost.

[0026] In the form cassette unit of said configuration, if a form is set to the form cassette 11, according to the die length of a form, the tail guide 12 will be moved in the direction of arrow-head A for guides 61 and 62 by the direction of arrow-head D according to the width of face of a form. In connection with this, a link 16 is

rocked in the direction of arrow-head B, and a lever 71 rocks it in the direction of arrow-head E. And a drum 24 is rotated and a slider 72 is made to reciprocate with rocking of said lever 71 with rocking of said link 16.

[0027] If the 1st contact section 58 of the detection lever 56 is made to engage with the drive projection 51 of a drum 24 at this time, the predetermined detection lever 56 of the switching action object 53 will be made to rock, and the switch which pushes the follower projections 33a-33d, and corresponds by the 3rd contact section 60 will be turned ON. On the other hand, if the 2nd contact section 59 of the detection lever 56 is made to engage with the signal generator 77 of a slider 72, the predetermined detection lever 56 of the switching action object 53 will be made to rock, the depression which are the follower projections 33a-33d will be lost, and a corresponding switch will be turned off. In addition, in drawing 10, it is pushed and a switch is ON, the follower projections 33b and 33d are not pushed, but the switch of the follower projections 33a and 33c is off.

[0028] Drawing 11 is drawing showing the example of the actuation table of the switch in the 1st example of this invention. In drawing, it is shown that the switch of O is off in the switch of - being ON. As shown in drawing, the width of face of a form is in agreement by the case where the form of A3 seal is set to the form cassette 11 ( drawing 1 ) in every length, and the case where the form of A4 seal is set to the form cassette 11 by every side. Moreover, the die length of a form is in agreement by the case where the form of A4 seal is set to the form cassette 11 by every side, and the case where the form of A5 seal is set to the form cassette 11 in every length.

[0029] However, the die length of each form and the combination of width of face are discriminable with turning on and off of switches 1-4. By the way, when it is going to detect the size of the form with which die length differs every only, a link 16 cannot be made to fully rock and exact size cannot be detected. Therefore, the form which can detect size will be restricted.

[0030] Then, the 2nd example to which the form which can detect size was made not to be restricted is explained. The perspective view of a form cassette unit [ in / in drawing 12 R> 2 / the 2nd example of this invention ] and drawing 13 are the top views of the form cassette unit in the 2nd example of this invention. In drawing, 11 is the tail guide arranged in the direction of arrow-head A free [ migration ] in the back section of a form cassette and the form cassette 11 in the conveyance direction of the form which 12 does not illustrate. Therefore, a slot 13 can be formed in said form cassette 11, a pin 14 can be formed in said tail guide 12, and this pin 14 can be slid now along said slot 13.

[0031] Moreover, in order to detect the location of said tail guide 12, the deformation link 81 of a rhombus (comparing backlash) is arranged. The end of this deformation link 81 is connected with a link 16 through a pin 82, and is supported free [ rocking ] by using a pin 82 as the supporting point. On the other hand, the other end of said deformation link 81 is connected with the tail guide 12 through said pin 14, and is supported free [ rocking ] by using a pin 14 as the supporting point. And it applies to an end side from the center section of the deformation link 81, the long slot 83 is missing from an other end side, the long slot 84 is formed, and said long slot 83 and pin 82 are made to engage with the long slot 84 and a pin 14.

[0032] Moreover, a pin 86 makes the top face of said deformation link 81 project, it is formed in it, and this pin 86 and the long slot 89 formed in the form cassette 11 are made to engage with it. And a pin 87 makes the inferior surface of tongue of said deformation link 81 project, it is formed in it, and this pin 87 and the long slot 92 formed in the bottom covering 91 of the form cassette 11 are made to engage with it. Said long slot 89 extends along the printing direction of a form, and has the "\*" character-like configuration where a front half approaches said pin 82 side. On the other hand, said long slot 92 extends along the printing direction of a form, and has the "\*" character-like configuration where a rear half approaches said pin 82 side.

[0033] And the end of said link 16 is connected with said form cassette 11 through a pin 17, and is supported free [ rocking ] by using a pin 17 as the supporting point. On the other hand, the other end of a link 16 is connected with the deformation link 81 through said pin 82, and is supported free [ rocking ] by using a pin 82 as the supporting point. Therefore, if said tail guide 12 is moved in the direction of arrow-head A, a link 16 will rock a pin 14, moving a pin 82 along the long slot 83 along the long slot 84. Moving the tail guide 12 slightly, since said pin 87 moves along the long slot 89 along the long slot 92 at this time can also make a link 16 rock [ pin / 86 ] greatly.

[0034] Rocking movement of this link 16 can be transmitted to the drum 24 arranged free [ rotation ], and can make now the switch which is not illustrated turn on and off by rotating this drum 24. Therefore, the sector link gear 21 is attached in the edge by the side of the pin 17 of said link 16, on the other hand, the drum gear which

is not illustrated is attached in said drum 24, and the link gear 21 and a drum gear are meshed. Moreover, the location in a circumferencial direction and the location in shaft orientations are mutually changed in the perimeter of said drum 24, and two or more drive projections 51 are arranged in it.

[0035] In this example, the width of face of the form set to the form cassette 11 can also be detected now.

Therefore, the guides 61 and 62 of a pair are arranged in the front section of the form cassette 11 in the conveyance direction of a form free [ migration in the direction of arrow-head D ]. And a sector lever 71 and a sector slider 72 are arranged so that the location of these guides 61 and 62 can be detected. Said lever 71 is supported free [ rocking in the direction of arrow-head E ], and said slider 72 is arranged in the direction of arrow-head F free [ migration ].

[0036] Furthermore, in order to make it correspond to the rotation location of said drum 24, and the migration location of a slider 72 and to make a switch turn on and off, the switching action object 53 is arranged free [ rocking ]. Therefore, the die length and width of face of a form are detectable with a switch unit 25. In addition, this invention is not limited to said example, and it is possible to make it deform variously based on the meaning of this invention, and it does not eliminate these from the range of this invention.

[0037]

[Effect of the Invention] As explained to the detail above, according to this invention, it sets to a form cassette unit. The form cassette which holds a form, and the tail guide arranged in the conveyance direction of a form free [ migration ], You interlock migration of said guide with the guide arranged in the perpendicular direction free [ migration ] to the conveyance direction of a form, and the drum on which you made it migration of said tail guide interlocked with, it was rotated, and the drive projection was formed, and it is made to reciprocate, and has the slider with which irregularity was formed.

[0038] Moreover, it has the switching action object which is arranged free [ two or more switches which detect the size of a form, and rocking ], engages with said drive projection and irregularity, is made to correspond to an engagement condition, and is made to turn a switch on and off by turning on and off. In this case, the rotation location of a drive projection changes corresponding to rotation of said drum, and a concavo-convex location changes corresponding to reciprocation of a slider. And it is made for a predetermined switch to be turned on and off corresponding to the rotation location of said drive projection, and a predetermined switch is made to turn on and off by the concavo-convex location.

[0039] Therefore, by turning on and off of a switch, the die length of each form and the combination of width of face can be identified, and the size of a form can be detected correctly.

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[Translation done.]

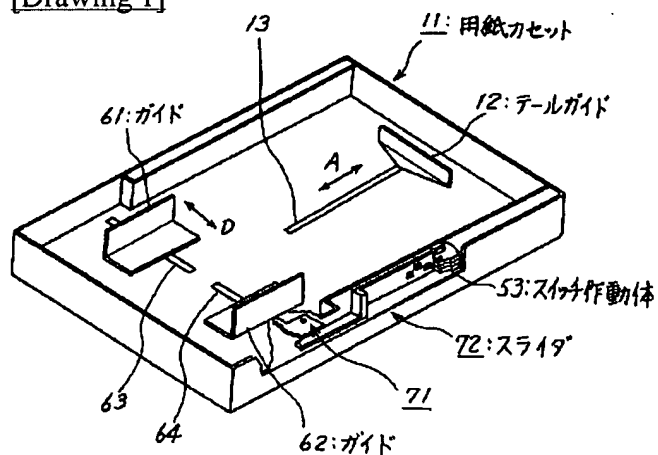
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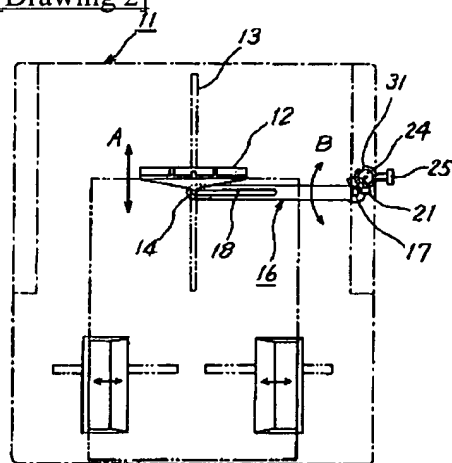
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## DRAWINGS

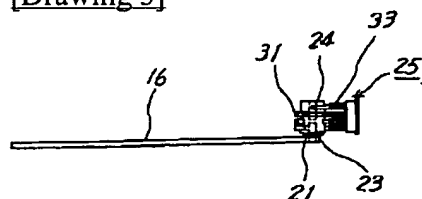
[Drawing 1]



[Drawing 2]

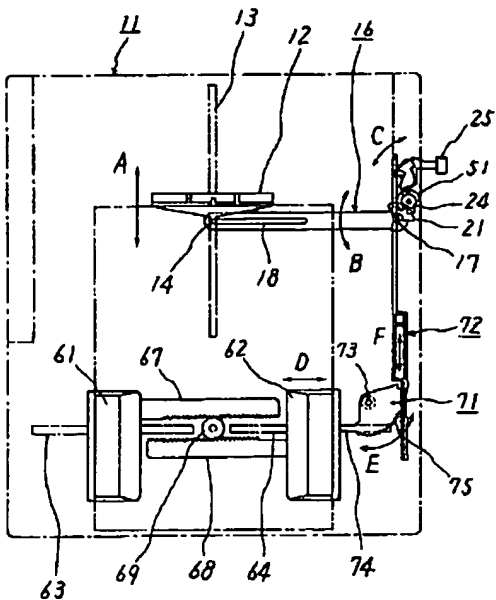


[Drawing 3]

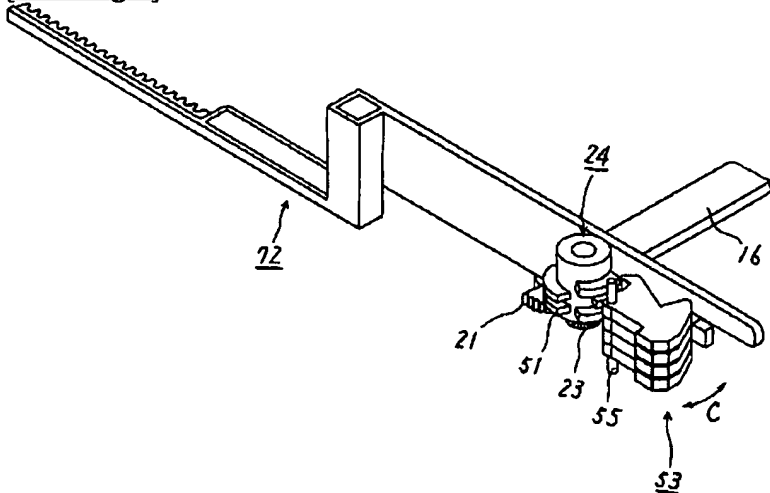


[Drawing 4]





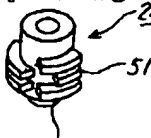
[Drawing 5]



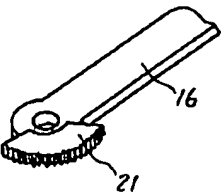
[Drawing 7]



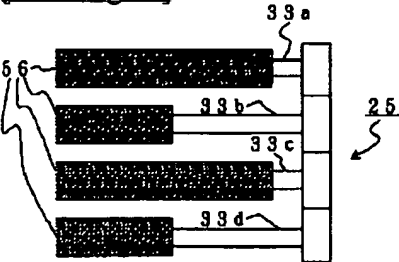
[Drawing 8]



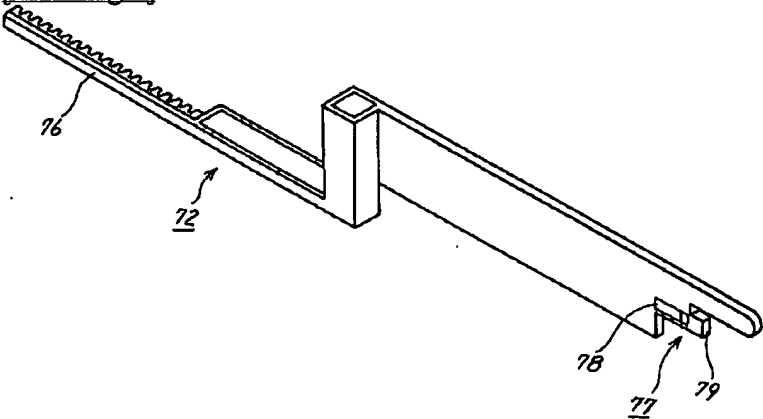
[Drawing 9]



[Drawing 10]



[Drawing 6]

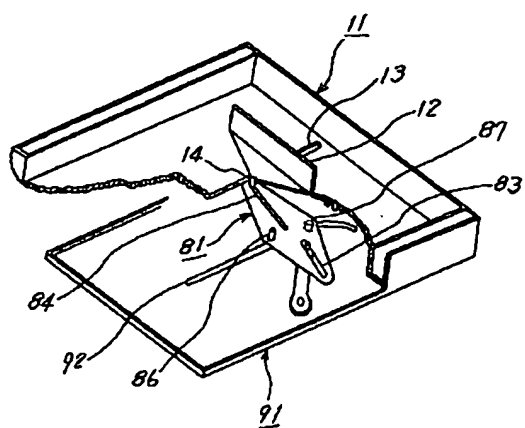


[Drawing 11]

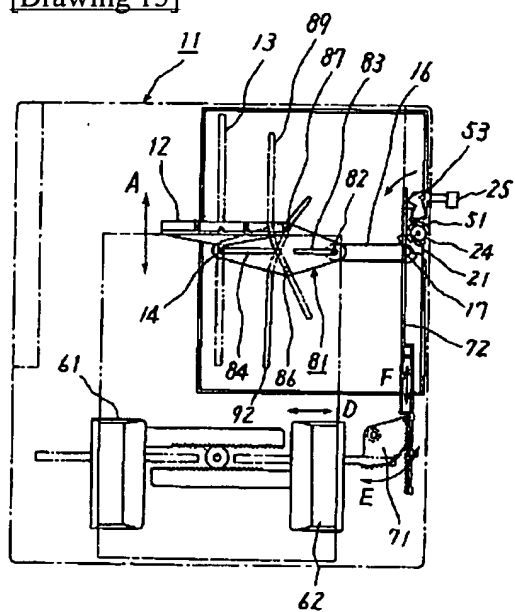
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2	○	●	○	○	
3	●	○	●	●	
4	●	○	○	○	
● オン ○ オフ					

幅が一致      長さが一致

[Drawing 12]



[Drawing 13]



[Translation done.]

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